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## (54) Coupling device and method for fabricating a grip ring to be used in such a coupling device

(57) Coupling device for a pipe, comprising a sleeve (1) having an insert end (2) for the pipe and a sealing means adapted for realising a seal around the pipe when inserted in the sleeve, said sealing means comprising a plurality of mutually slidable elements (6) which together form a ring (3), and a grip ring (4) being

mounted within said elements and extending along at least a part of the perimeter of the pipe, the grip ring being formed with dents pressed out of the plane of the grip ring.

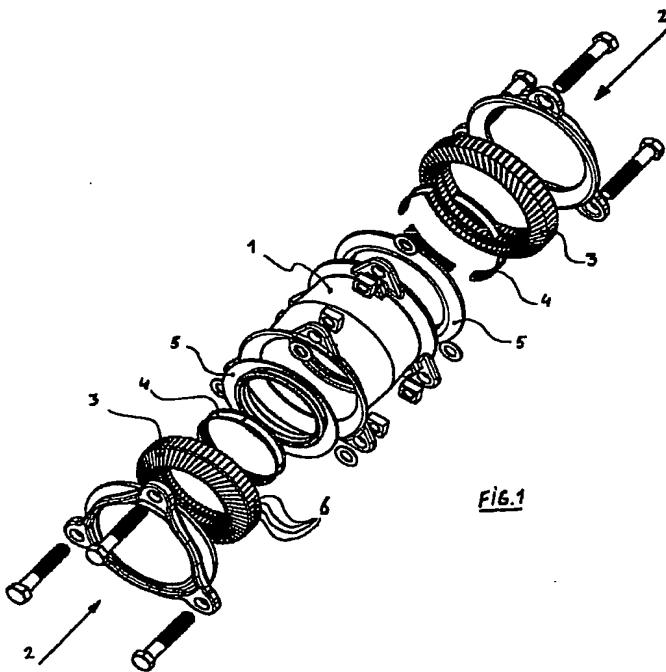


Fig. 1

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**Description**

[0001] The invention relates to a coupling device for a pipe, comprising a sleeve having an insert end for the pipe and a sealing means adapted for realising a seal around the pipe when inserted in the sleeve, said sealing means comprising a plurality of mutually slidable elements which together form a ring, and a grip ring being mounted within said elements and extending along at least a part of the perimeter of the pipe.

[0002] Such a coupling device is disclosed in the European patent application EP-A-0 794 378 assigned to the present applicant. The prior art coupling device is being used for pipes made of steel, stainless steel, eternite, cast-iron, coated steel, PVC, polyethylene and asbestos cement, and is intended for coupling two of such pipes. It is important that on the one hand the coupling device provides a sufficient seal, and that on the other hand the coupling device is able to withstand tensile strain. The latter function is provided by the grip ring which is part of the prior art coupling device.

[0003] It is the objective of the invention to improve the function of said grip ring. Said objective is achieved by the inventive coupling device being characterized in that the grip ring is provided with dents pressed out of the plane of the grip ring.

[0004] It is particularly desirable that the dents which are pressed out of the plane of the grip ring are adjacent to slit-like openings punched out of the grip ring. It has been shown that the resistance to tensile strain of the coupling device according to the invention is thereby considerably improved with respect to the coupling device according to the prior art. Employment of the coupling device with hard pipes like pipes of cast-iron, steel, stainless steel and the like, having a diameter of 150 mm results in the prior art in an achievable resistance to tensile strain of 7 bar. Said value amounts to 40 bar when employing the inventive coupling device. According to the inventor this is brought about by the burr which results when punching the openings out of the plane of the grip ring.

[0005] It is preferred that the openings have a width B such that the ratio B/D is less than 3, D being the thickness of the grip ring. In this way the grip ring which is part of the coupling device according to the invention remains sufficiently strong in spite of the formation of the openings.

[0006] It is preferred that the dents approximately halfway the openings are situated maximally out of the plane of the grip ring. In this way approximately triangle-like dents are provided, burrs formed by punching of the openings and located at the edge of said dents being optimally effective in providing grip on the pipes with which the coupling device is employed.

[0007] It is further preferred that the grip ring is made of stainless spring steel having a tensile strength of at least 1200 N/mm<sup>2</sup>, preferably approximately 1400-1600 N/mm<sup>2</sup>. In this way the effectiveness of the grip provided

according to the invention may be maximally employed because the strength characteristics inherent to such material are fully utilized by cold deformation of the material due to punching and dent-formation which increases the tensile strength.

[0008] The invention is also embodied in a method for fabricating a grip ring to be used in a coupling device according to the invention, said method being characterized in that the slit-like openings are punched and that subsequently in a forming process small dents are pressed out of the plane of the plate adjacent to the openings, followed by giving the plate an at least approximate ring-shape.

[0009] The invention will be further elucidated with the aid of the drawing in which

Fig. 1 shows an exploded view of the coupling device according to the invention;

Fig. 2 shows the grip ring which is part of the coupling device according to the invention; and

Figs. 3 and 4 show the grip ring of Fig. 2 in cross-section A-A and B-B, respectively.

[0010] Identical reference numerals used in the figures refer to like parts.

[0011] Referring to Fig. 1, the coupling device is shown in an exploded view and comprises a sleeve 1 having an insert end 2 for a pipe which is not shown, and a sealing means 3, 4, 5 adapted for realising a seal around the pipe when inserted in the sleeve 1, said sealing means 3, 4, 5 comprising a plurality of mutually slidable elements 6 which together form a ring 3, and a grip ring 4 being mounted within said elements 6 and extending along at least a part of the perimeter of the pipe, said grip ring 4 being formed with dents pressed out of the plane of the grip ring. For a further description of the coupling device one is referred to EP-A-0 794 378 which is considered to be incorporated at this point.

[0012] Referring to the Figs. 2, 3 and 4, the configuration of the grip ring 4 is further elucidated. As stated the grip ring 4 is formed with dents 7 pressed out of the plane of the grip ring, clearly shown in top-view in Fig. 2 and in cross-section and side-view in Fig. 3 and 4, respectively. The dents 7 pressed out of the plane of the grip ring 4 are adjacent to slit-like openings 8 punched out of the grip ring 4, shown in Fig. 2 and 3. The openings 8 have a width B, as viewed transverse to the peripheral direction of the grip ring 4, such that the ratio B/D is less than 3, D being the thickness of the grip ring 4 as indicated in Fig. 3. In Fig. 2 it is clearly shown that the dents approximately halfway the openings 8 are positioned maximally out of the plane of the grip ring 4. This is more clearly shown in Fig. 4.

[0013] Several kinds of material may be used for fabricating the grip ring 4. Preferably the grip ring 4 is made of stainless spring steel having a tensile strength of at least 1200 N/mm<sup>2</sup> and preferably being in the range of approximately 1400-1600 N/mm<sup>2</sup>. The grip ring 4 is

according to the invention preferably fabricated such that slit-like openings 8 are punched in preferably a stainless steel plate, strip or band, and that next small dents 7 are pressed out of the plane of the plate adjacent to the openings 8, in a process as such known to the skilled person, followed by giving the plate an at least approximate ring shape.

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**Claims**

1. Coupling device for a pipe, comprising a sleeve having an insert end for the pipe and a sealing means adapted for realising a seal around the pipe when inserted in the sleeve, said sealing means comprising a plurality of mutually slidable elements which together form a ring, and a grip ring being mounted within said elements and extending along at least a part of the perimeter of the pipe, characterized in that the grip ring (4) is provided with dents (7) pressed out of the plane of the grip ring. 10
2. Coupling device according to claim 1, characterized in that the dents (7) which are pressed out of the plane of the grip ring (4) are adjacent to slit-like openings (8) punched out of the grip ring (4). 15
3. Coupling device according to claim 1 or 2, characterized in that the openings (8) have a width B such that the ratio B/D is less than 3, D being the thickness of the grip ring. 20
4. Coupling device according to claim 1-3, characterized in that the dents (7) approximately halfway the openings (8) are situated maximally out of the plane of the grip ring (4). 25
5. Coupling device according to claim 1-4, characterized in that the grip ring (4) is made of stainless spring steel having a tensile strength of at least 1200 N/mm<sup>2</sup>, preferably approximately 1400-1600 N/mm<sup>2</sup>. 30
6. Method for fabricating a grip ring to be used in a coupling device according to any one of claims 1-5, characterized in that the slit-like openings (8) are punched and that subsequently in a forming process small dents (7) are pressed out of the plane of the plate adjacent to the openings (8), followed by giving the plate an at least approximate ring-shape. 35

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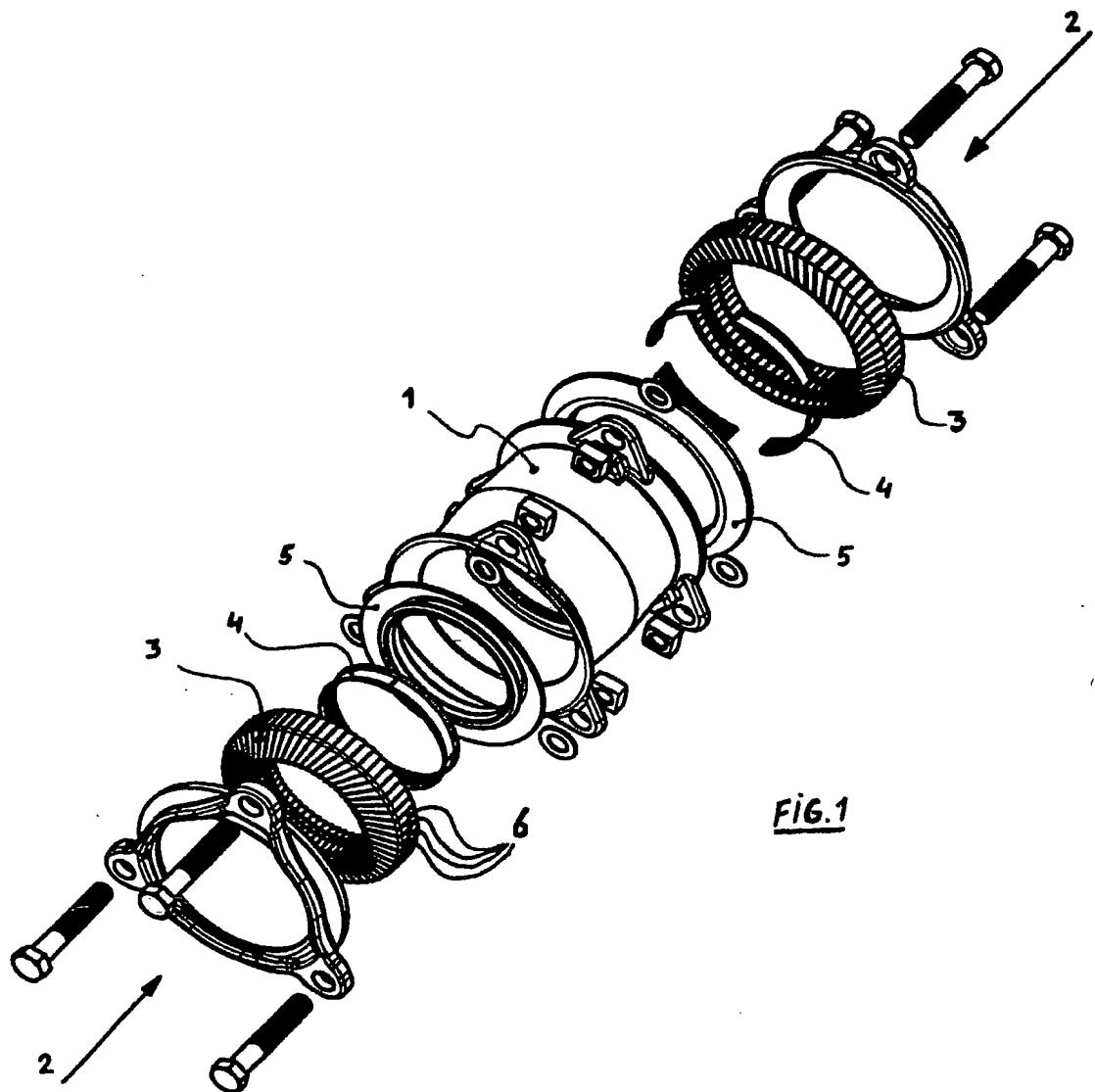
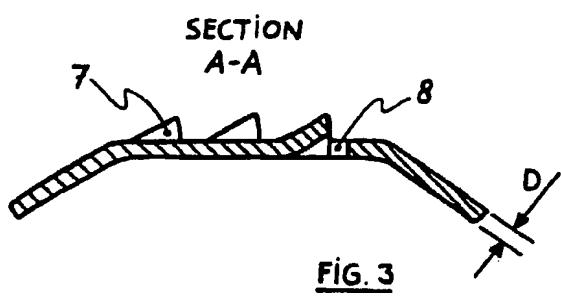
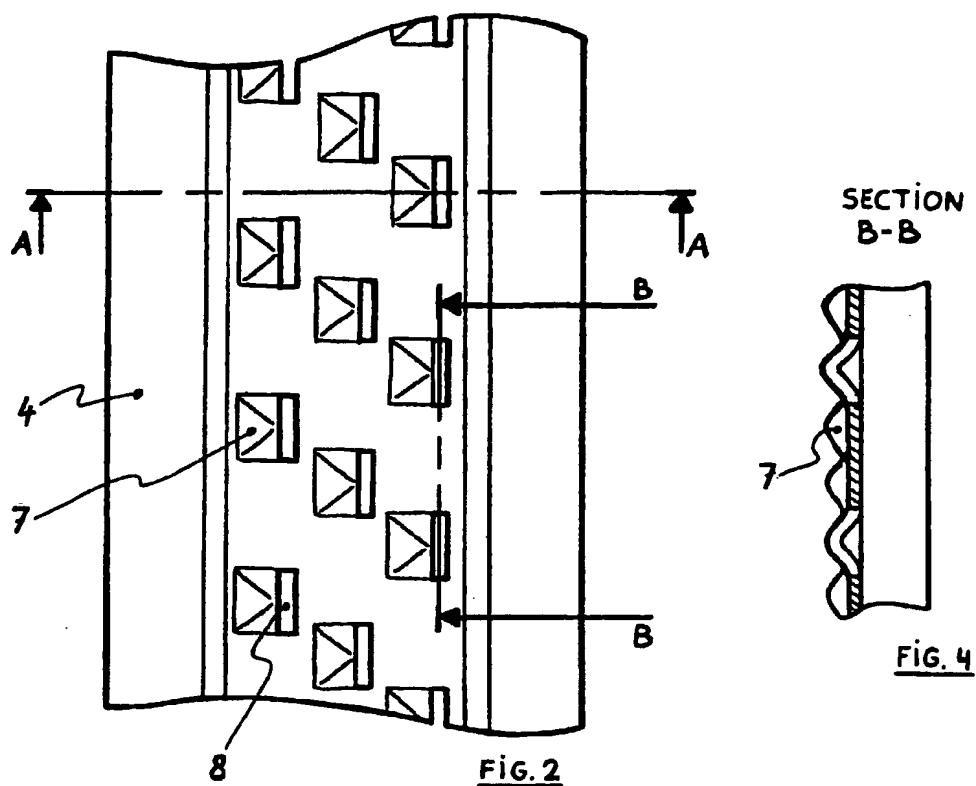


FIG.1





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## EUROPEAN SEARCH REPORT

Application Number  
EP 99 20 2204

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
Y,D	EP 0 794 378 A (G. FISCHER WAGA N.V.) 10 September 1997 (1997-09-10) * abstract; figures 1-3B *	1	F16L21/04 F16L21/08						
A		6							
Y	CH 664 813 A (H. HEER & CO. AG) 31 March 1988 (1988-03-31) * abstract; figures 1-3 *	1							
A	DE 24 30 248 A (K. WILLEMS) 15 January 1976 (1976-01-15) * figures 1,2 *	1,6							
A	FR 2 369 495 A (COUPLING SYSTEMS, INC.) 26 May 1978 (1978-05-26) * claims 1-16; figures 1-7 *	1,6							
			TECHNICAL FIELDS SEARCHED (Int.Cl.)						
			F16L						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>1 November 1999</td> <td>Angius, P</td> </tr> </table> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone      Y : particularly relevant if combined with another document of the same category      A : technological background      O : non-written disclosure      P : intermediate document</p> <p>T : theory or principle underlying the invention      E : earlier patent document, but published on, or after the filing date      D : document cited in the application      L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>				Place of search	Date of completion of the search	Examiner	THE HAGUE	1 November 1999	Angius, P
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THE HAGUE	1 November 1999	Angius, P							

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 20 2204

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-11-1999

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 794378	A	10-09-1997		NL 1002514 C BR 9701158 A CA 2196473 A CN 1167889 A HR 970052 A JP 10002470 A NO 970763 A PL 318779 A		05-09-1997 15-12-1998 04-09-1997 17-12-1997 30-06-1998 06-01-1998 05-09-1997 15-09-1997
CH 664813	A	31-03-1988		NONE		
DE 2430248	A	15-01-1976		NONE		
FR 2369495	A	26-05-1978		US 4070046 A AU 3011577 A CA 1069959 A CA 1078427 A DE 2748429 A GB 1591743 A US 4119335 A		24-01-1978 03-05-1979 15-01-1980 27-05-1980 03-05-1978 24-06-1981 10-10-1978